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REMARKS

The abstract of the disclosure and the disclosure have been revised and amended to conform the same to the amended claims and to correct minor errors. No new subject matter has been added.

The claims have been amended to better clarify the present invention to overcome the Examiner's rejections under 35 U.S.C. 103(a), and to improve the idiom. No new subject matter has been added.

Rejection under 35 U.S.C. 103(a)

Reconsideration of the rejections of claims 1-12 and 16-23 under 35 U.S.C. 103(a) as being unpatentable over Oetiker (US Pat. 5,299,344) in view of Woolsey (US Pat. 2,659,954) is respectfully requested for the following reasons.

Re claim 1: The present invention refers to a heavy-duty (see page 2, lines 15-28; page 5, line 6; page 7, lines 4-9; and page 10, lines 13-24 of the disclosure) clamp for a hose that includes a loop for disposing around the hose and having first and second axially spaced apart looped ends. The clamp comprises a force generator, for drawing together the first and second looped ends, and connected to the first and second looped ends. The force generator includes at least one disc spring mounted thereon and made out of steel (such as stainless steel) material (see page 2, lines 28-30 of the disclosure) so as to allow substantially high and constant clamping force (see page 2, lines 15-28; page 10, lines 9-24 of the disclosure) from the force generator under operational condition (wide range of temperature and humidity) of the clamp (see page 1, line 12 - page 3, line 2; and page 10, lines 9-13 of the disclosure). The clamp further comprises a spacer

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member mounted on the force generator between the disc spring and the first looped end for axially transferring the clamping force from the force generator to the first and second looped ends, the clamping force axially drawing together the first and second looped ends so as to clamp the hose. (Emphasis added)

Oetiker teaches a hose clamp having a band with two loop ends, and a force generator (screw member) to draw together the two loop ends. A retightening spring (44) is mounted between a cylindrical sleeve (41) and the screw head (43) to provide automatic retightening. Oetiker does not mention or suggest any consideration or need of a generally constant clamping force. Similarly, Oetiker does not mention or suggest any problem or concern related to corrosion of the spring over time that could affect the properties of the spring and therefore the clamping force exerted by the clamp (20) to the hose. Although Oetiker mentions that the band (21) and the gap reinforcing part (80) could be made out of galvanized steel or stainless steel (see col. 4, lines 22-25, and col. 6, lines 26-30), nowhere there is mention of any spring material. Furthermore, Oetiker's clamp is typically made for use with hoses carrying a medium that generates significant forces, and those are typically known in the art to undergo maximum clamping torque being in the range of about 15 in-lbs, not comparable to the high hoop torque range (up to 450 in-lbs) reachable with the heavy-duty clamp of the present invention. (Emphasis added)

On the other hand, Woolsey teaches a band coupling for pipes (not hoses), especially suited for V-band type couplings of flanged pipes such as jet engine exhaust pipes (see col.4, lines 44-49), having a disc-type spring (Belleville spring washers) to ensure a substantially constant loading, with substantially zero deflection rate, onto the coupling of two pipes subjected to extreme high temperature variation during operation thereof (see col.4, lines 44-71), which could not be provided by coil-type springs (see col.5, lines 43-54, Fig.6), the latter being simply unsuitable (col.1, lines 38-50; col.5, lines 72-74).

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Furthermore, in Woolsey's coupling, the axial clamping pressure at the flanges is mainly generated (amplified) by the angle of the frusto-conical side walls of the flanges as opposed to being generated directly by the clamping bolts which therefore need not to draw large hoop tensions to simply retain the coupling in place (see col.4, lines 28-43). Furthermore, the coupling of Woolsey is not suitable for high hoop torque range applications, especially using substantially flat bands (as opposed to V-bands), since the gap created between the two coupling attachment ends would prevent a uniform clamping pressure all around the pipe and therefore allows leakage there from. Also, nowhere Woolsey discloses any concern related to the need of corrosion resistant material for the disc springs, although the use of stainless steel-tungsten alloys is mentioned because of the retention of their relatively high resiliency characteristic even after prolonged periods of heating at temperatures in excess of 500°F (see col.5, lines 55-67). (Emphasis added)

In fact, anyone knowledgeable in the art would know that a stainless steel (soft steel material) coil spring not operatively affectable by corrosion over its operational life would need to be as large as the hose in diameter (if not larger) in order to reach high hoop torque range, which would be cumbersome and not practical at all, as opposed to stainless steel disc springs that are of a reasonable size for the same high hoop torque range; the disc springs further providing a substantially constant torque not available with the coil-type spring.

Accordingly, it is respectfully believed that it would not have been obvious at all to one having ordinary skill in the art at the time Applicant's invention was made to use a disc spring as taught by Woolsey for use with a coupling on aircraft flanged exhaust pipes with the clamp of Oetiker to get a heavy-duty hose clamp of the present invention since there is no suggestion in any of the references (especially Oetiker and Woolsey) for such combinations, Woolsey disclosing a low torque V-band coupling for pipes with disc springs and Oetiker disclosing a

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low torque flat band clamp with coil spring; two different devices for two different uses, and both different than the present invention device and use. (Emphasis added) This suggestion of combination however constitutes a prerequisite for a combination rejection as stated by the Patent Office Board of Appeal in its decision ex parte Walker 135 USPQ 195:

"In order to justify combination of references it is necessary not only that it be physically possible to combine them, but that the art should contain something to suggest the desirability of doing so."

The Court of Customs and Patent Appeal subscribes to the Board's reasoning when it handed down its decision in the case in re Inperato, 179 USPQ, 730 holding:

"The fact that the disclosures of references can be combined does not make combination obvious unless the art also contains something to suggest the desirability of such combination."

Re claims 2-12 and 16-23: Amended dependent claims 2-12, and 16-23 are respectfully believed to patentably distinguish the invention over the prior art cited by the Examiner for the similar reasons set out above with respect to claim 1 since they depend thereon.

More particularly:

Re claims 16, 17, 18, and 20: The applicant respectfully submits that the Examiner is erroneous when stating that Oetiker discloses respectively:

- the second bolt end including a stop (Oetiker only discloses that the last threads of the threaded shank portion near its free end are deformed after being screwed through the band-tightening member so that the screw-type tightening device can now be opened up more fully without danger of undesired disassembly by unscrewing the screw

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- member...(see col.8, line 65 - col.9, line 9); which does not damp to prevent unscrewing under major vibrations during operation);
- the stop being a lock nut, a Stover nut or a nylon insert nut;
 - the Stover nut or the nylon insert nut being integral with the stem portion of the second capture nut; and
 - the clamp loop, when viewed in cross section, including a planar portion and two ends that are angled away from the surface of the hose.

Nowhere the above characteristics are disclosed by Oetiker. (Emphasis added)

Re claim 22: Dependent claim 22 has been amended to better claim the plate.

Re claim 23: Dependent claim 23 has been amended to better define the disc spring as opposed to the hose.

Re claim 24: New dependent claim 24 refers to the guiding portion feature of the plate, as disclosed in the bottom of page 10 of the disclosure as filed.

With respect to the election/restriction, the applicant respectfully states, again, that claims 1, 2, 19, and 21-24 appear generic to all four species since all the limitations of these respective claims are present in all four species. Accordingly, these claims do not make any distinction upon the facts that the clamp includes more than one capture nut and that the clamp includes more than two looped ends (first and second looped ends). The fact that the loop disposed around the hose could be broken down in two (as shown in Figures 10 & 11, although more than two pieces could also be considered) segments attached to one another with a second force generator or the like between the additional two (third and fourth) looped ends is irrelevant, as long as the claimed features are present.

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Having more than one force generator simply increases and makes more uniform the holding pressure of the clamp around the hose, especially for large diameter hose applications. (Emphasis added)

Claims 1-12 and 16-24 should be found, as now amended, clearly allowable over the art cited by the Examiner.

Based on the above, it is believed that the present application is now in condition for allowance and a favorable action is solicited.

Respectfully submitted,

By


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